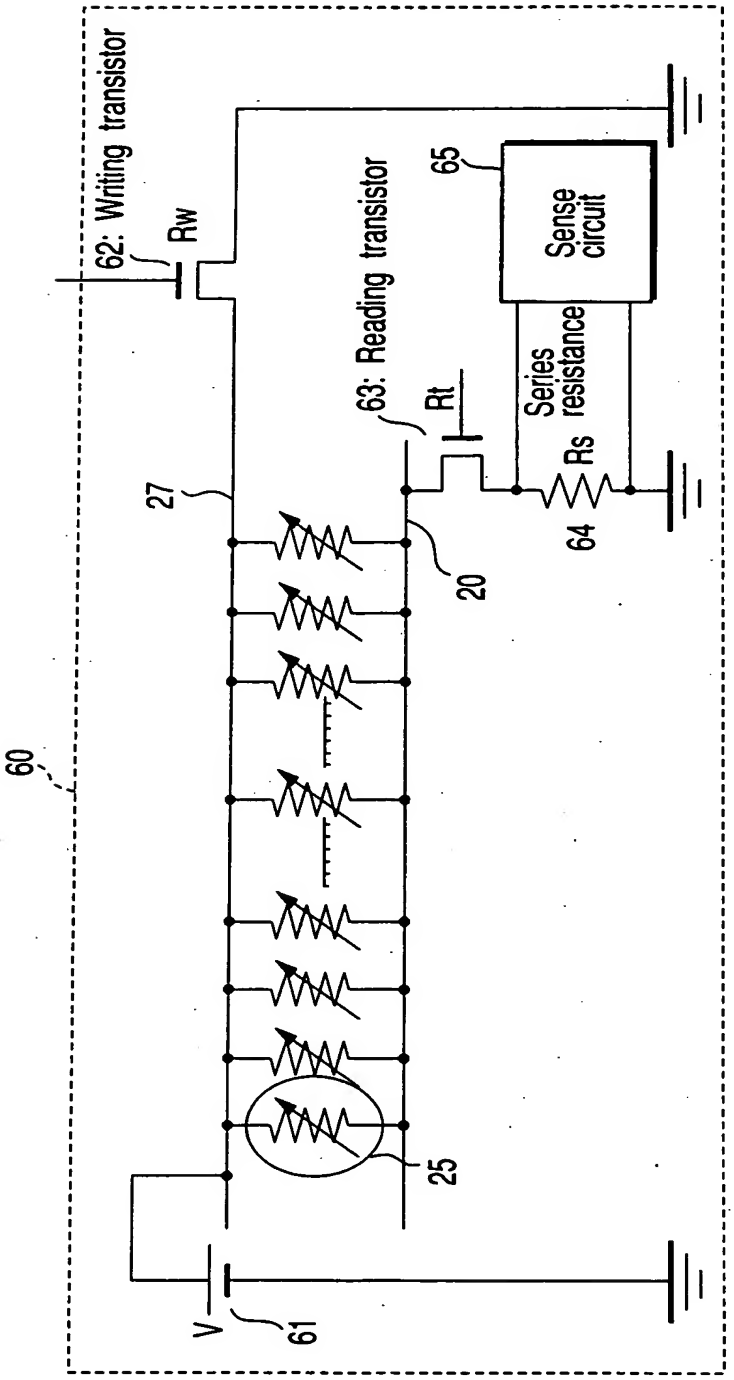
62: Writing transistor
Rw
63: Reading transistor
Rt
65
Sense circuit
Series resistance
Rs
64
27
20
60
25
V
61

FIG. 1

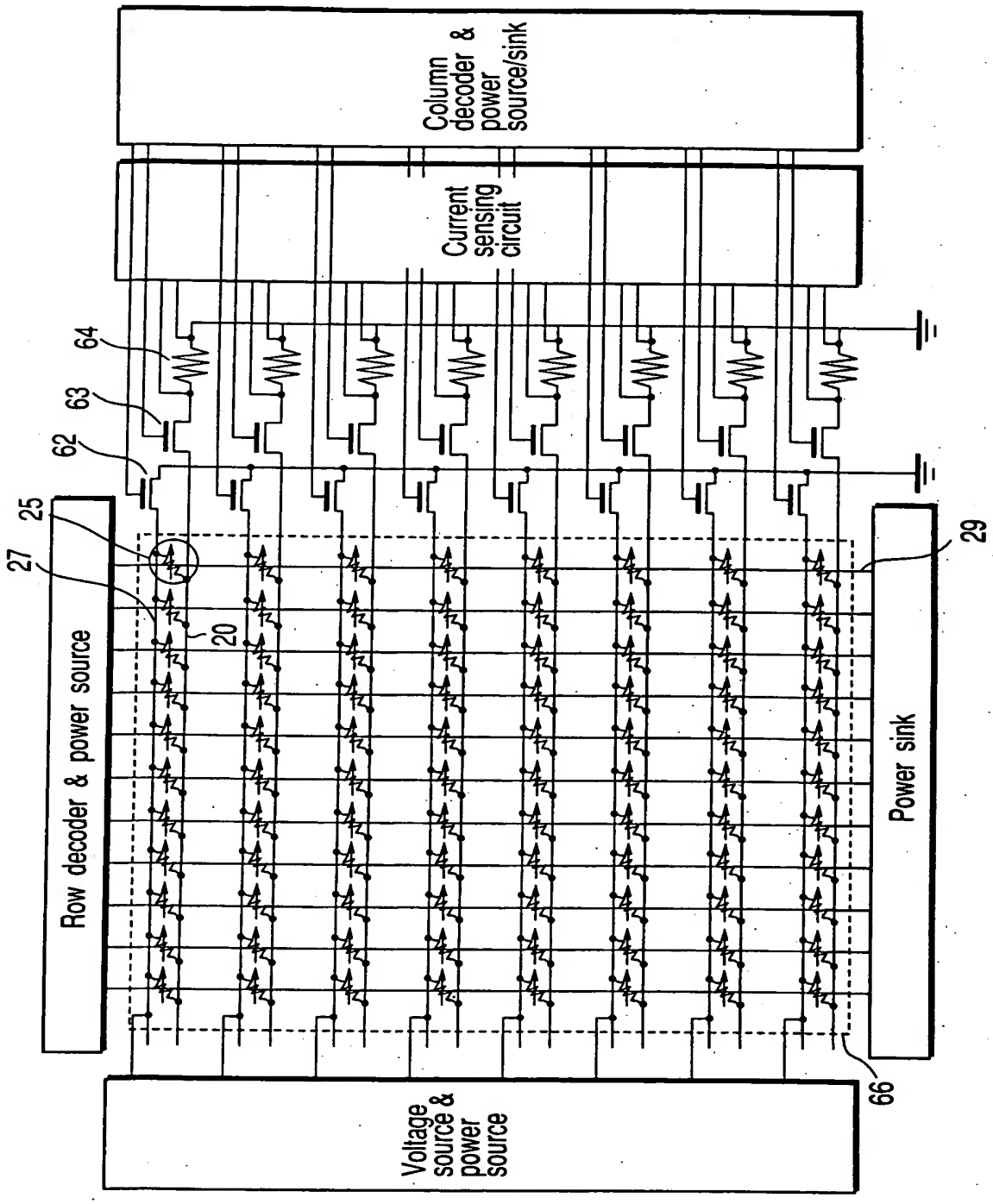
Column decoder & power source/sink
Current sensing circuit
64
63
62
25
27
20
29
Row decoder & power source
Power sink
66
Voltage source & power source

FIG. 2

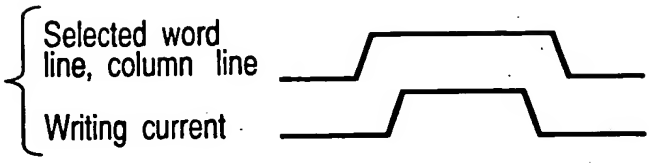
Selected word line, column line
Writing current

FIG. 3

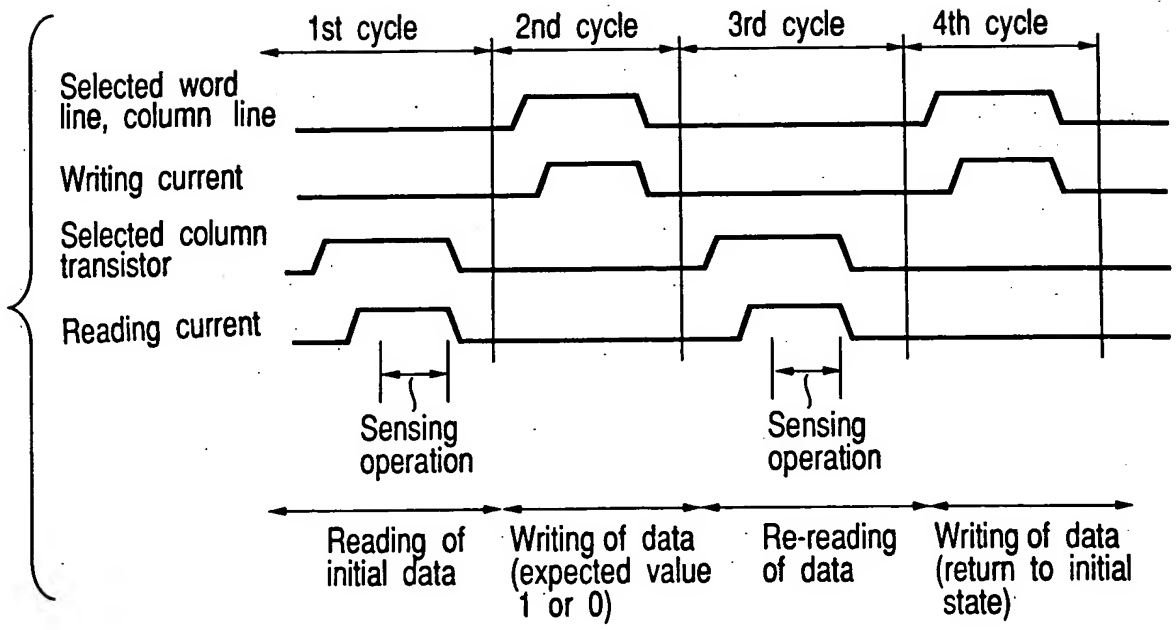
1st cycle
2nd cycle
3rd cycle
4th cycle
Selected word line, column line
Writing current
Selected column transistor
Reading current
Sensing operation
Sensing operation
Reading of initial data
Writing of data (expected value 1 or 0)
Re-reading of data
Writing of data (return to initial state)

FIG. 4

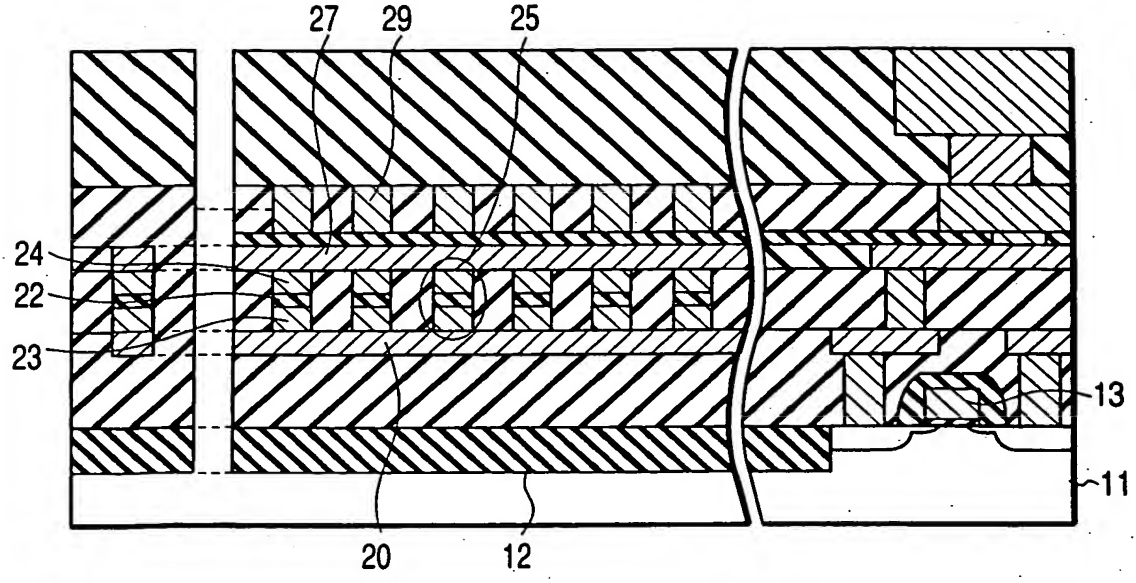

FIG. 5

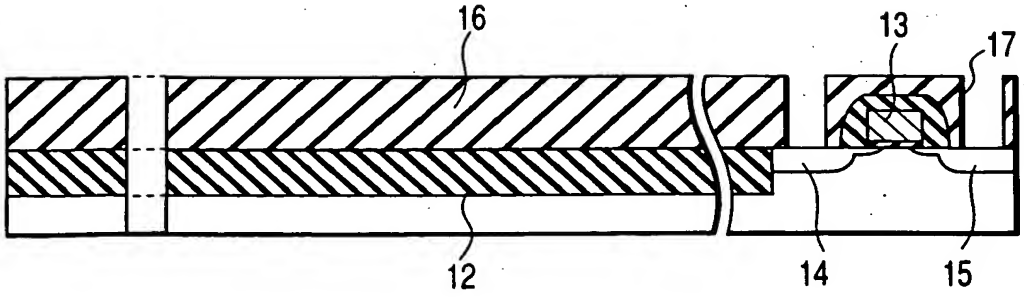

FIG. 6

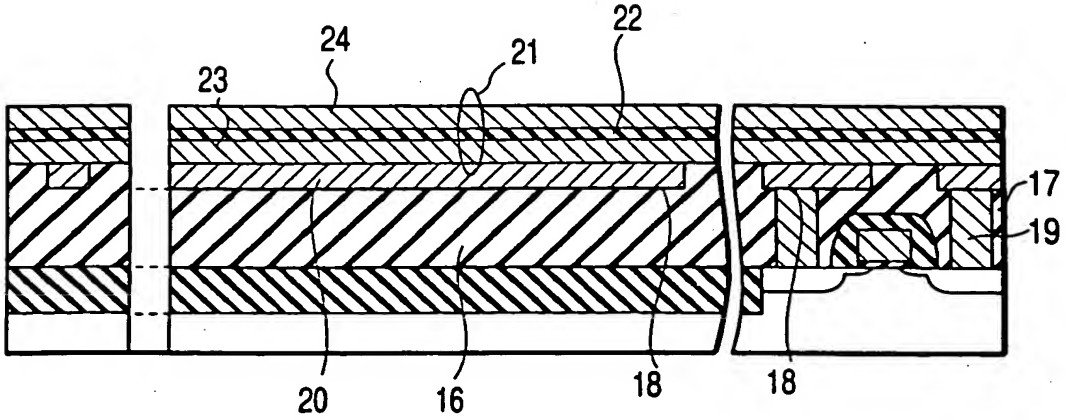

FIG. 7

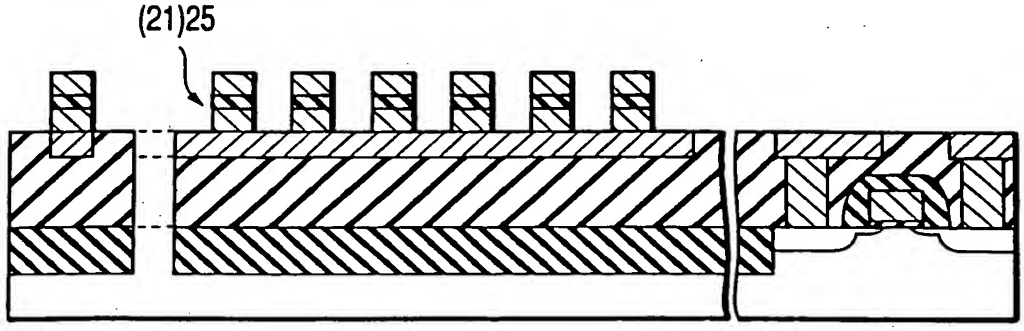

FIG. 8

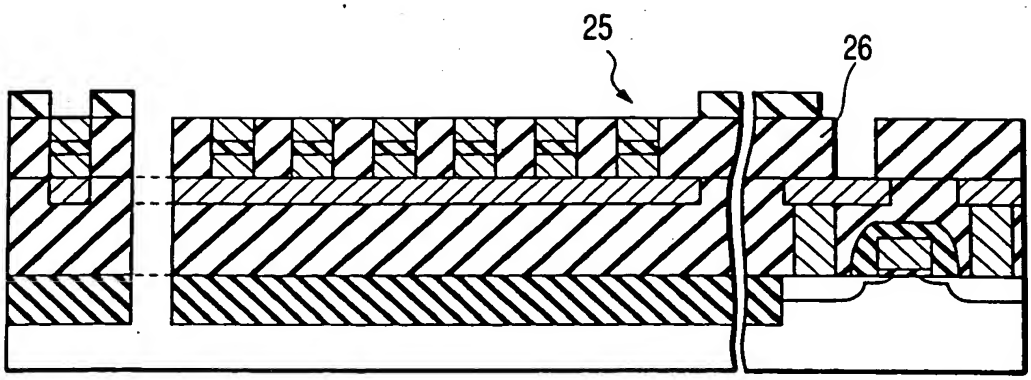

FIG. 9

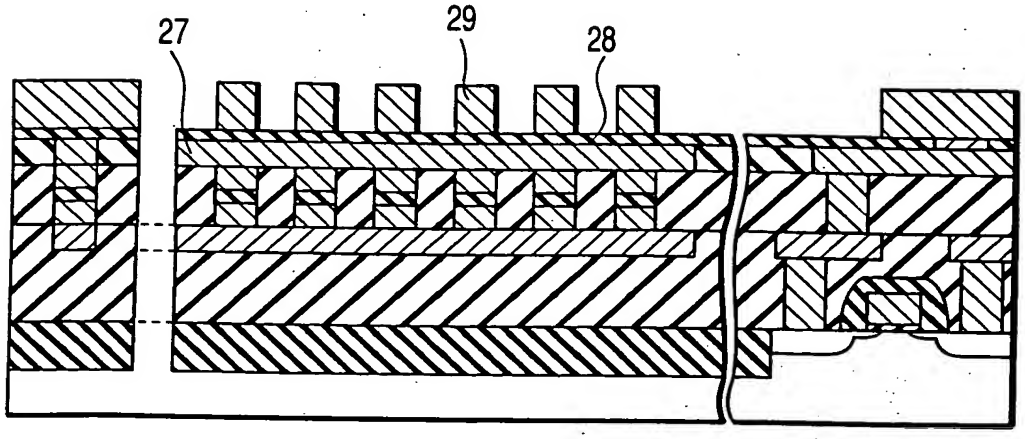

FIG. 10

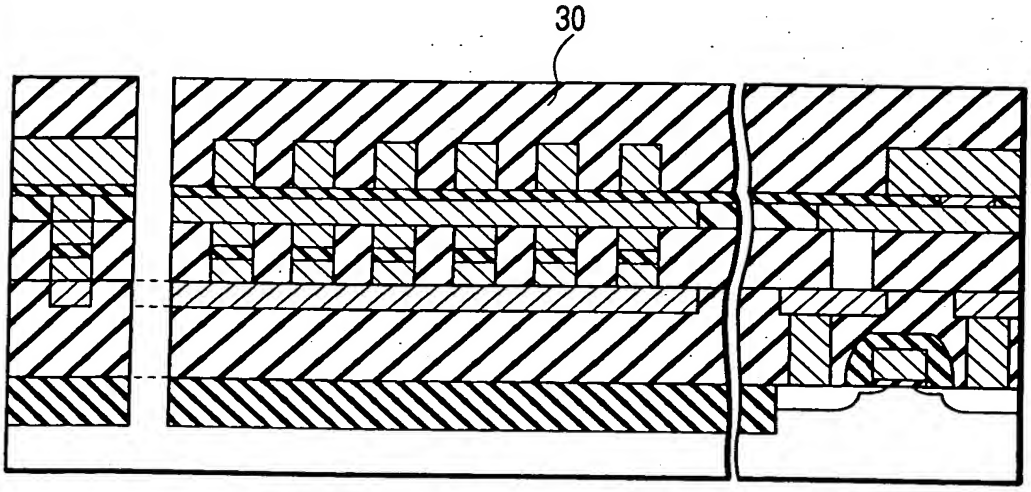

FIG. 11

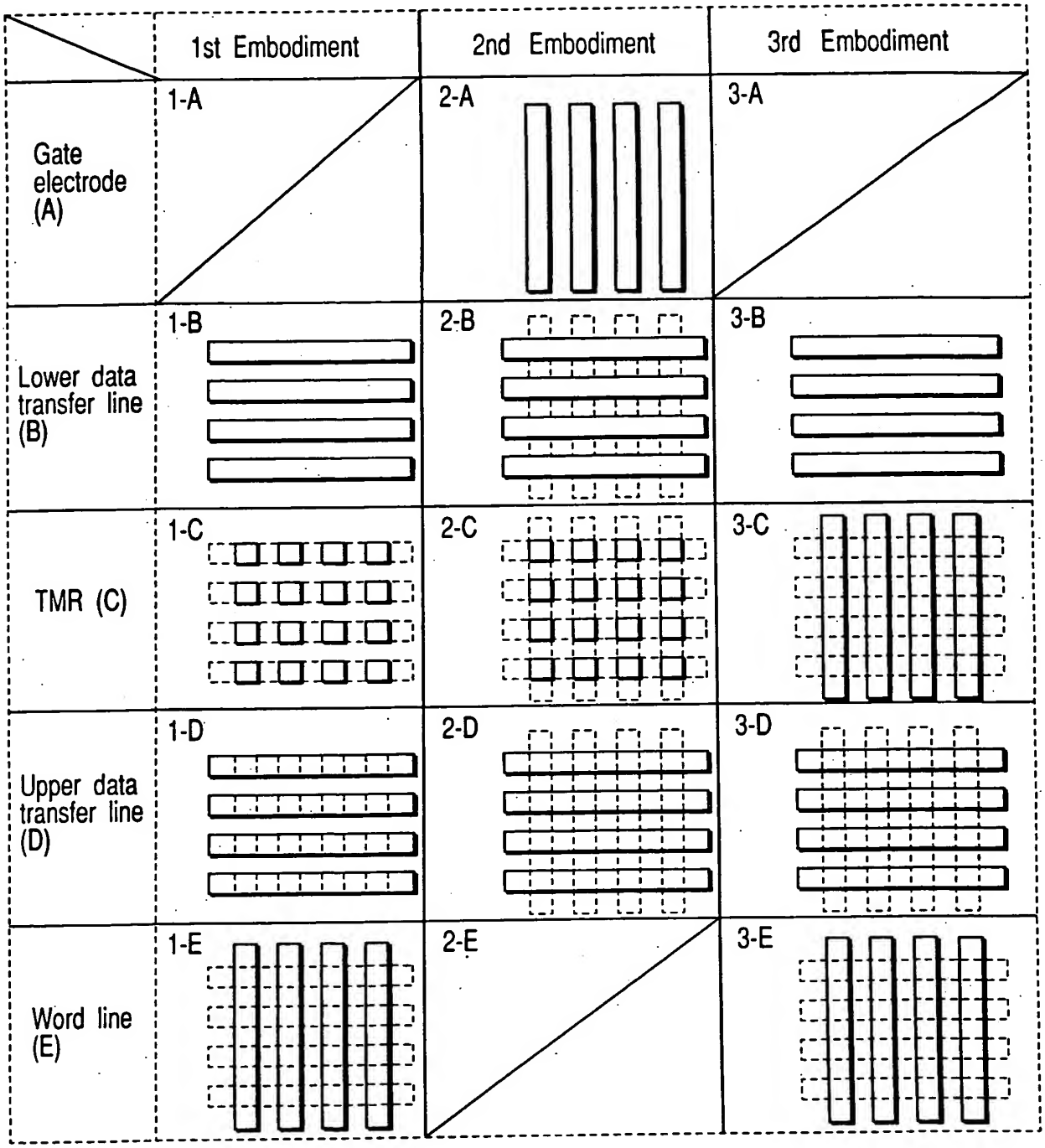
1st Embodiment
2nd Embodiment
3rd Embodiment
Gate electrode (A)
1-A
2-A
3-A
Lower data transfer line (B)
1-B
2-B
3-B
TMR (C)
1-C
2-C
3-C
Upper data transfer line (D)
1-D
2-D
3-D
Word line (E)
1-E
2-E
3-E

FIG. 12

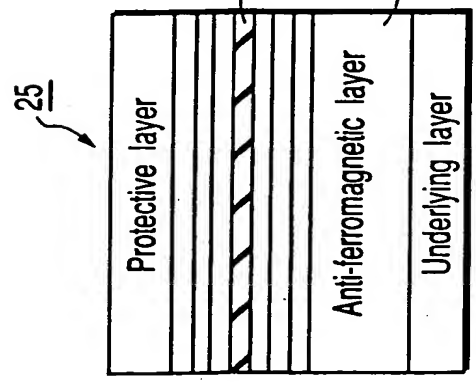

FIG. 13A

FIG. 13B

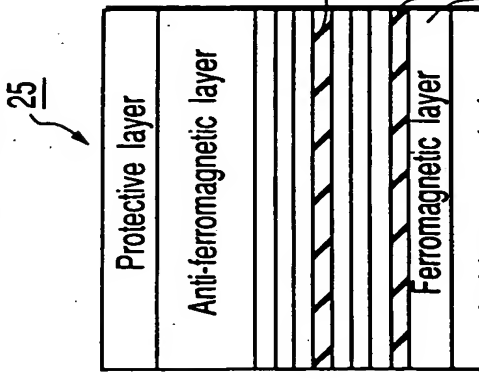

FIG. 13C

FIG. 13D

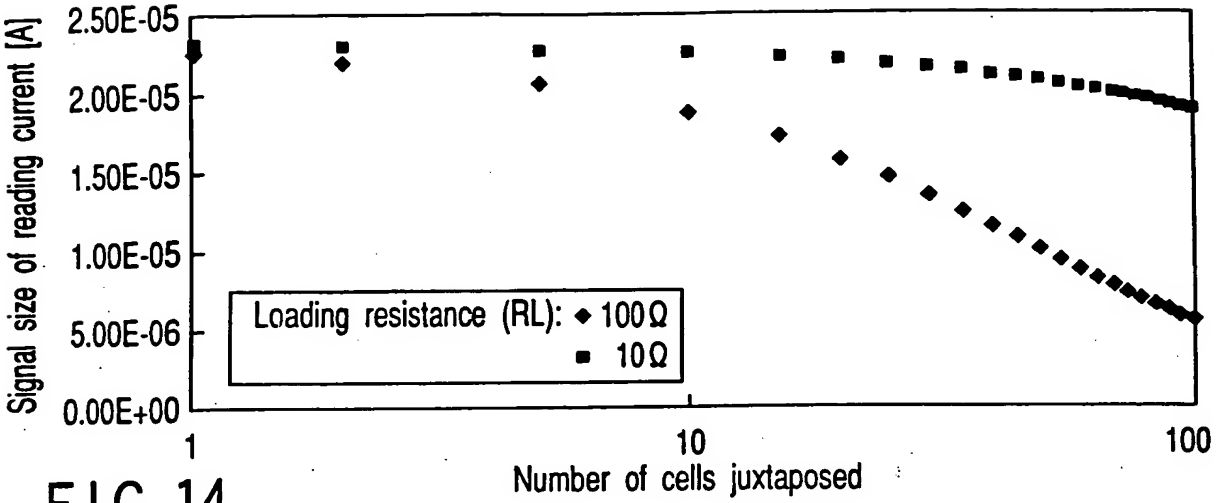

FIG. 14

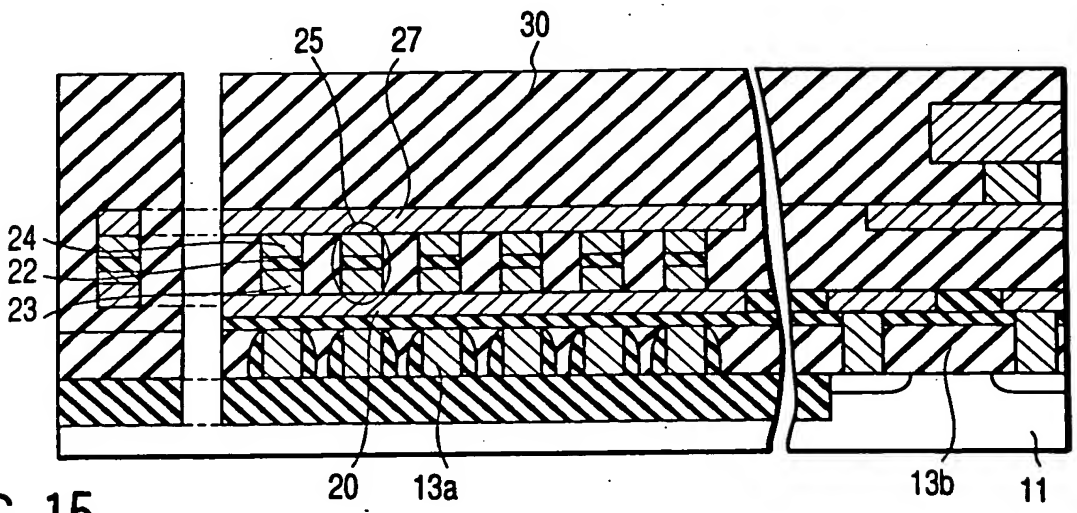

FIG. 15

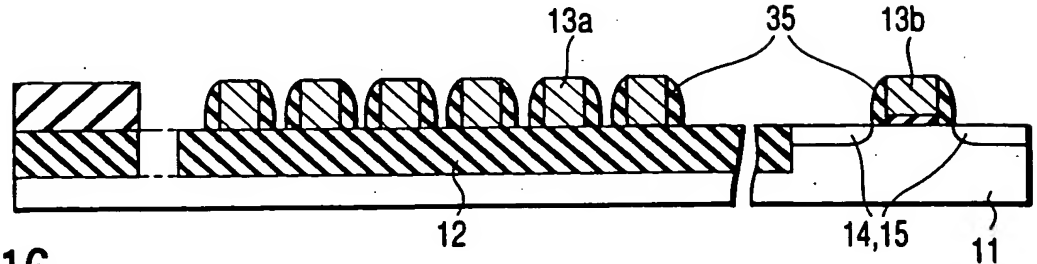

FIG. 16

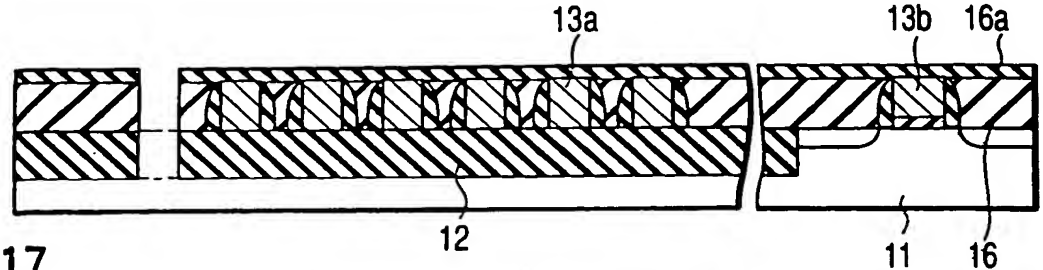

FIG. 17

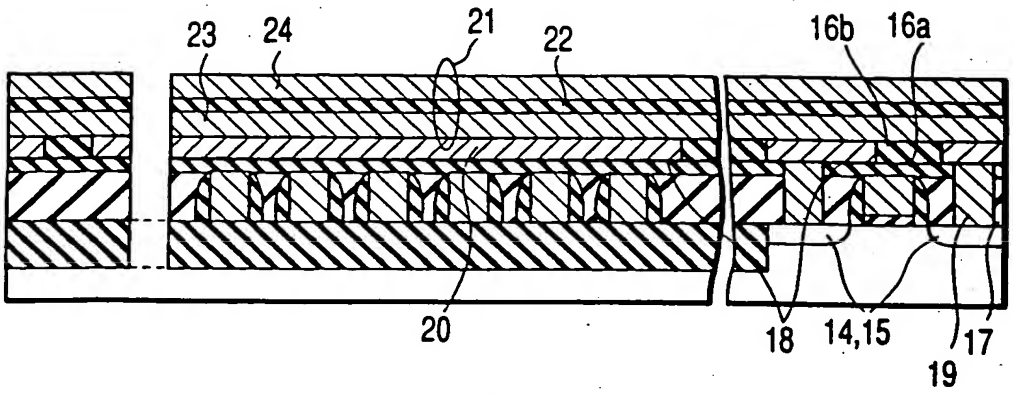

FIG. 18

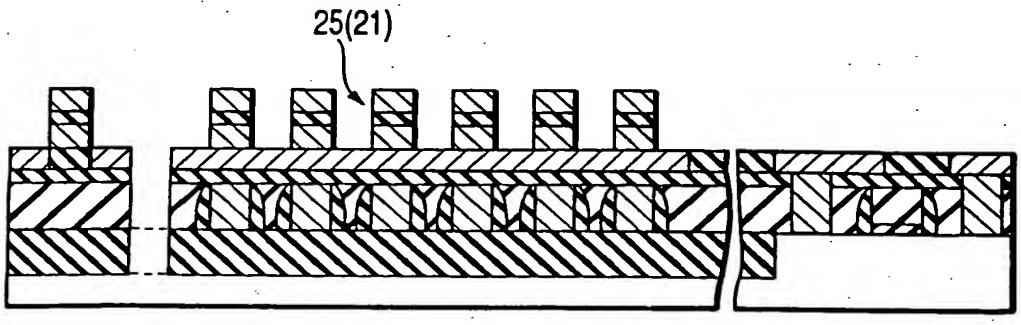

FIG. 19

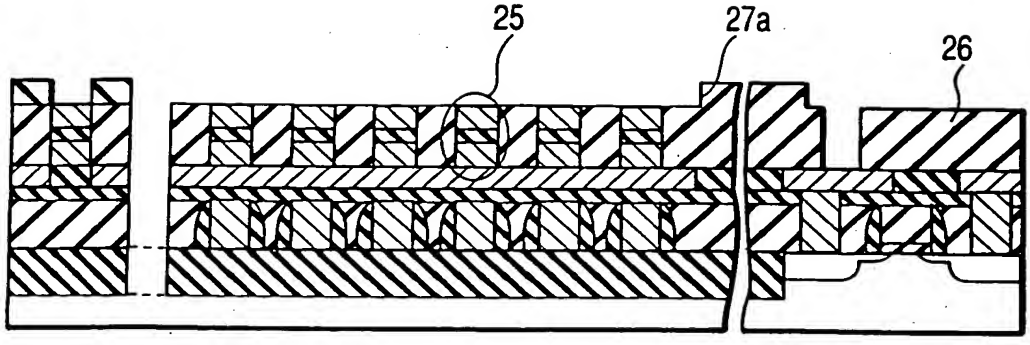

FIG. 20

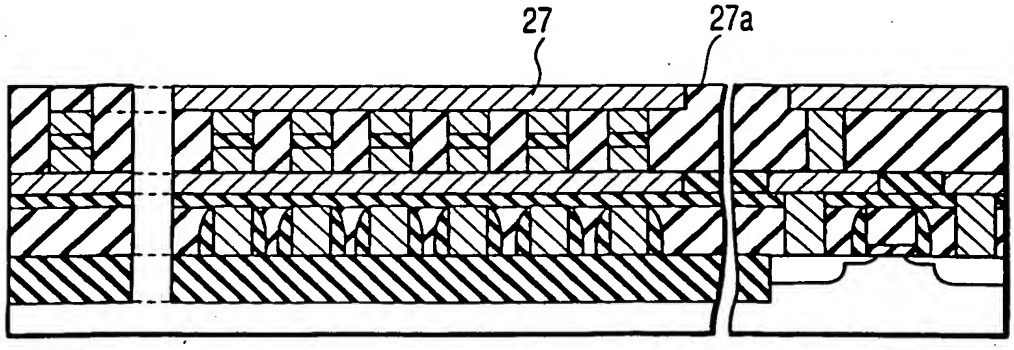

FIG. 21

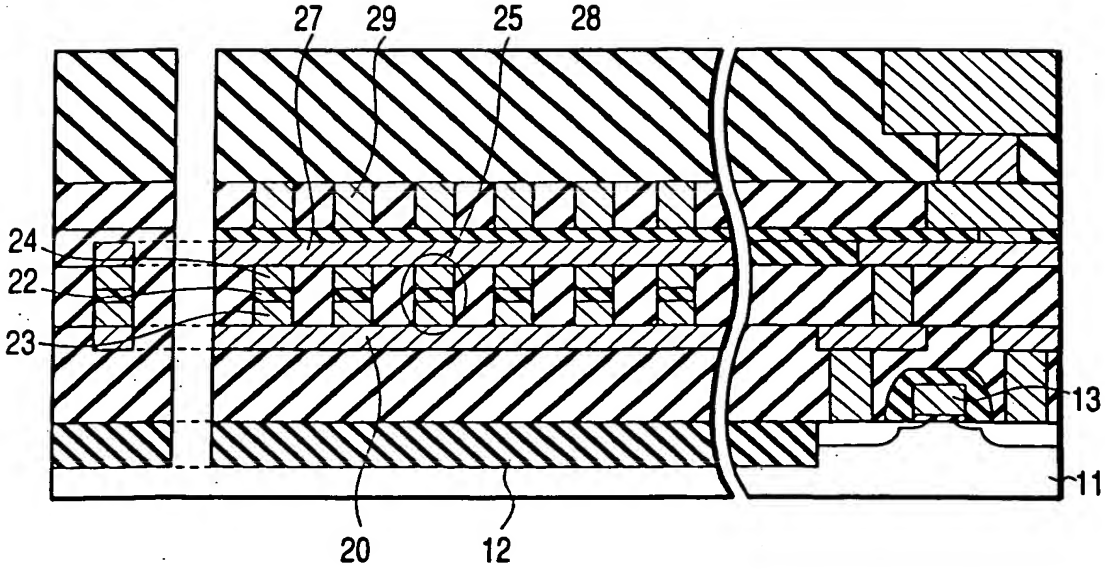

FIG. 22

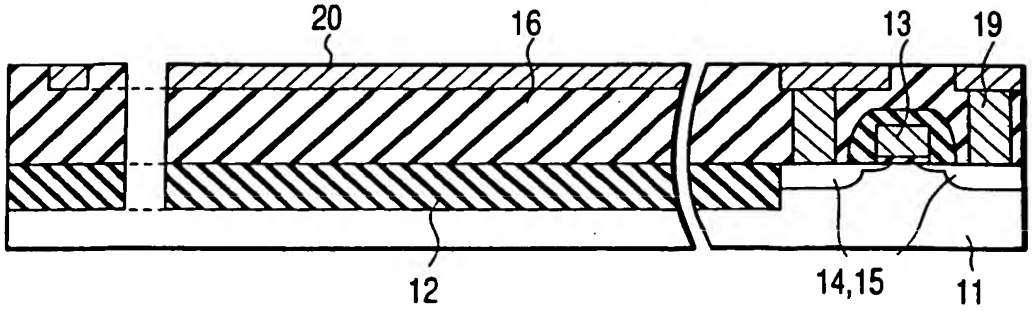

FIG. 23

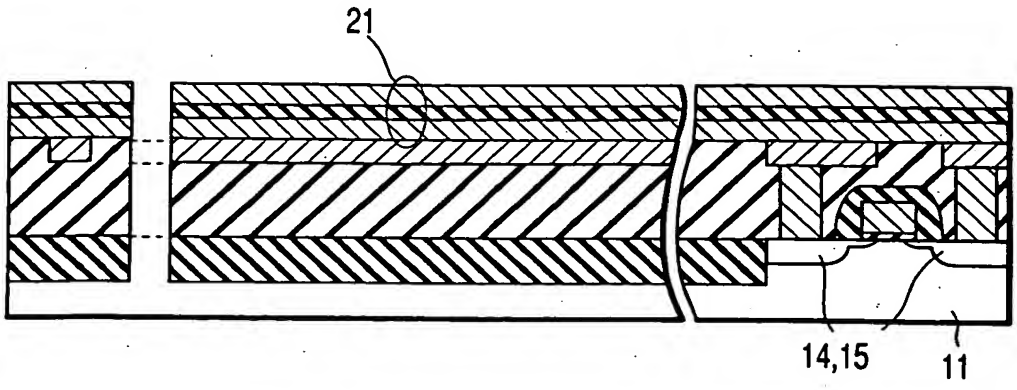

FIG. 24

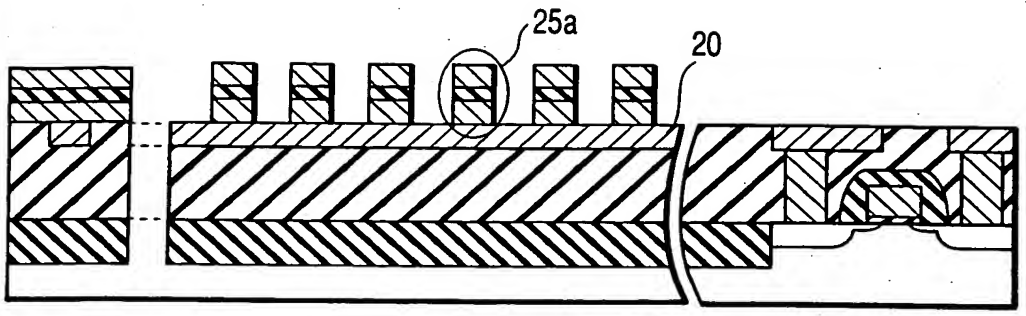

FIG. 25

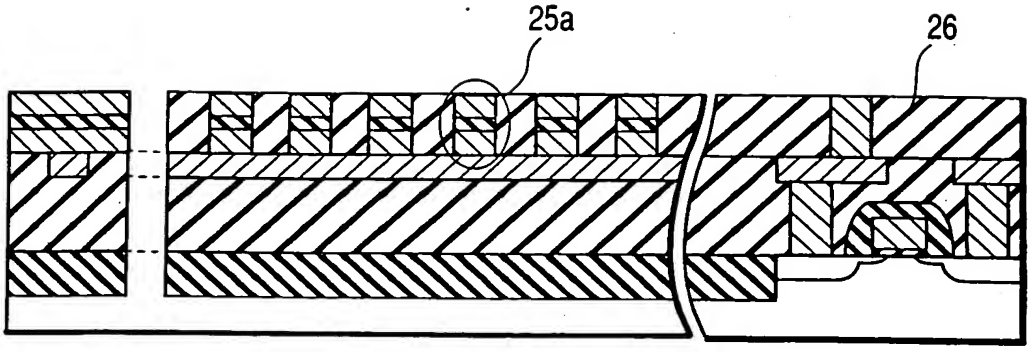

FIG. 26

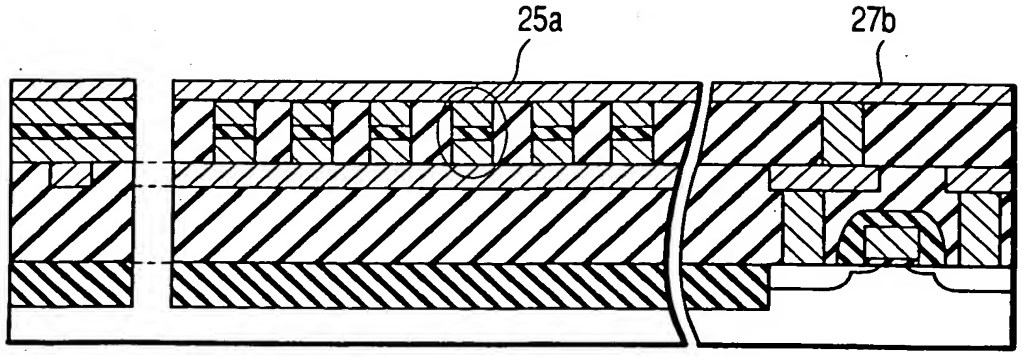

FIG. 27

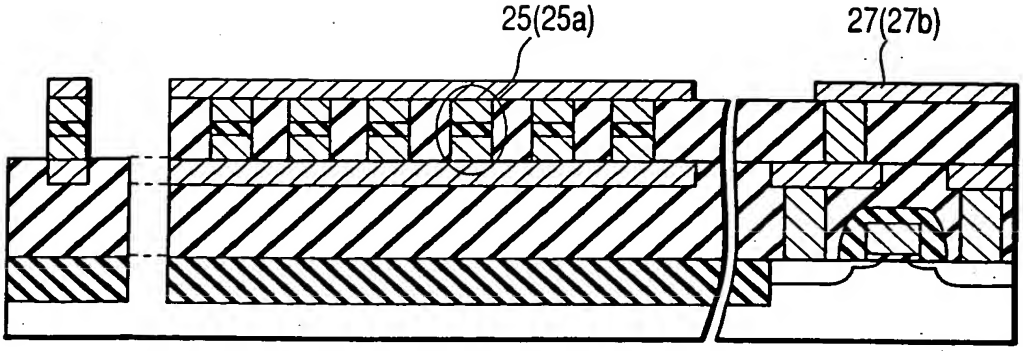

FIG. 28

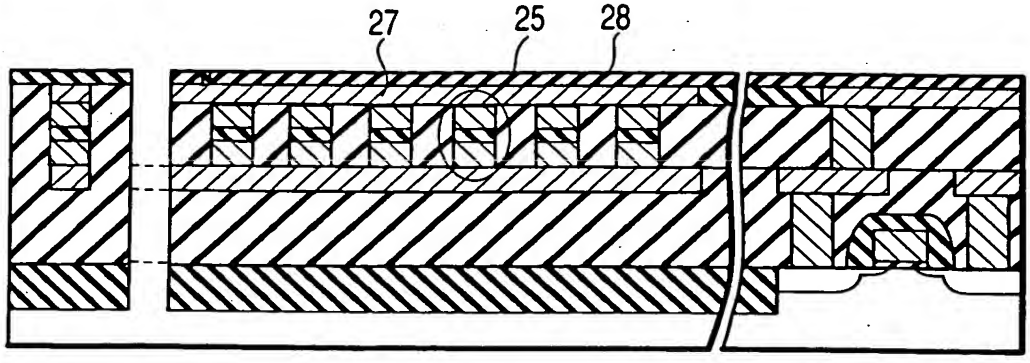

FIG. 29

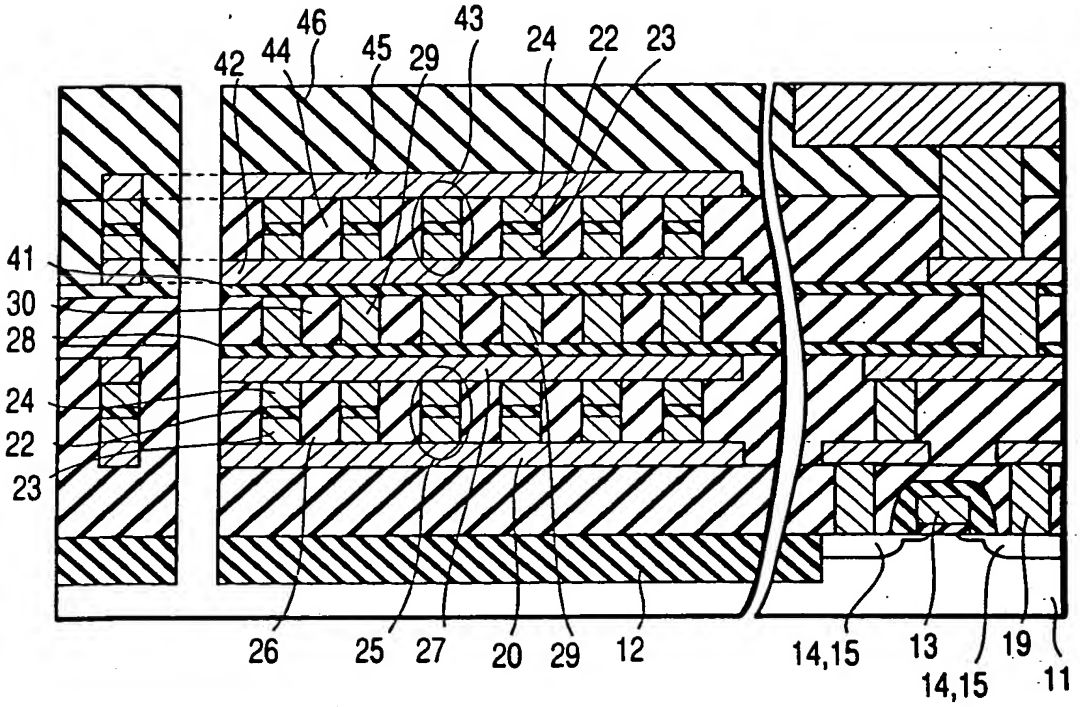

FIG. 30A

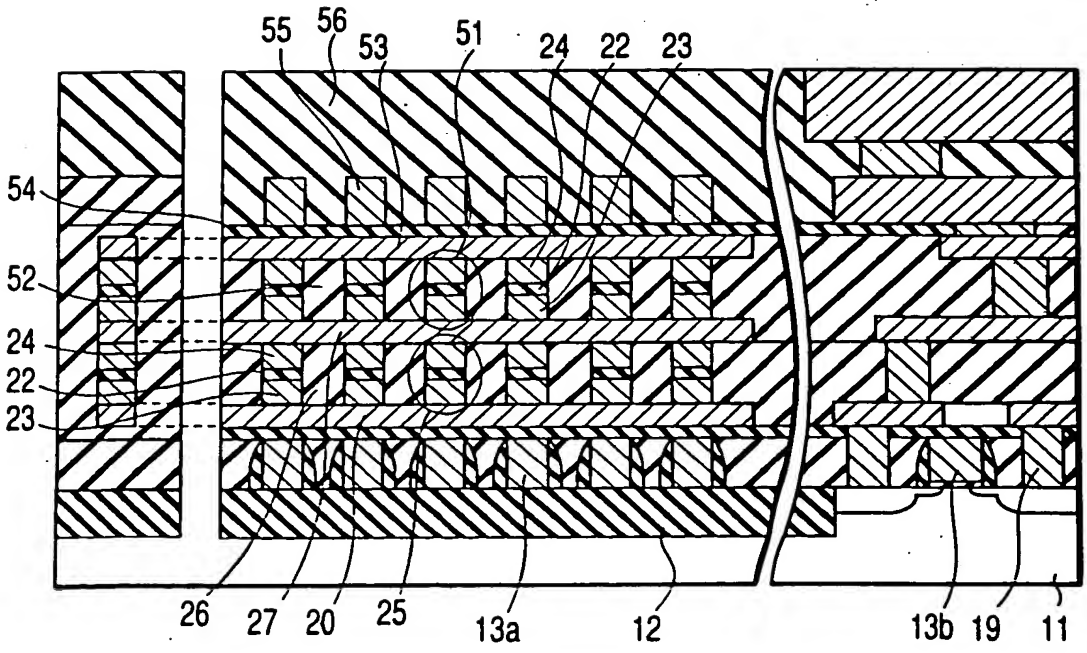

FIG. 31

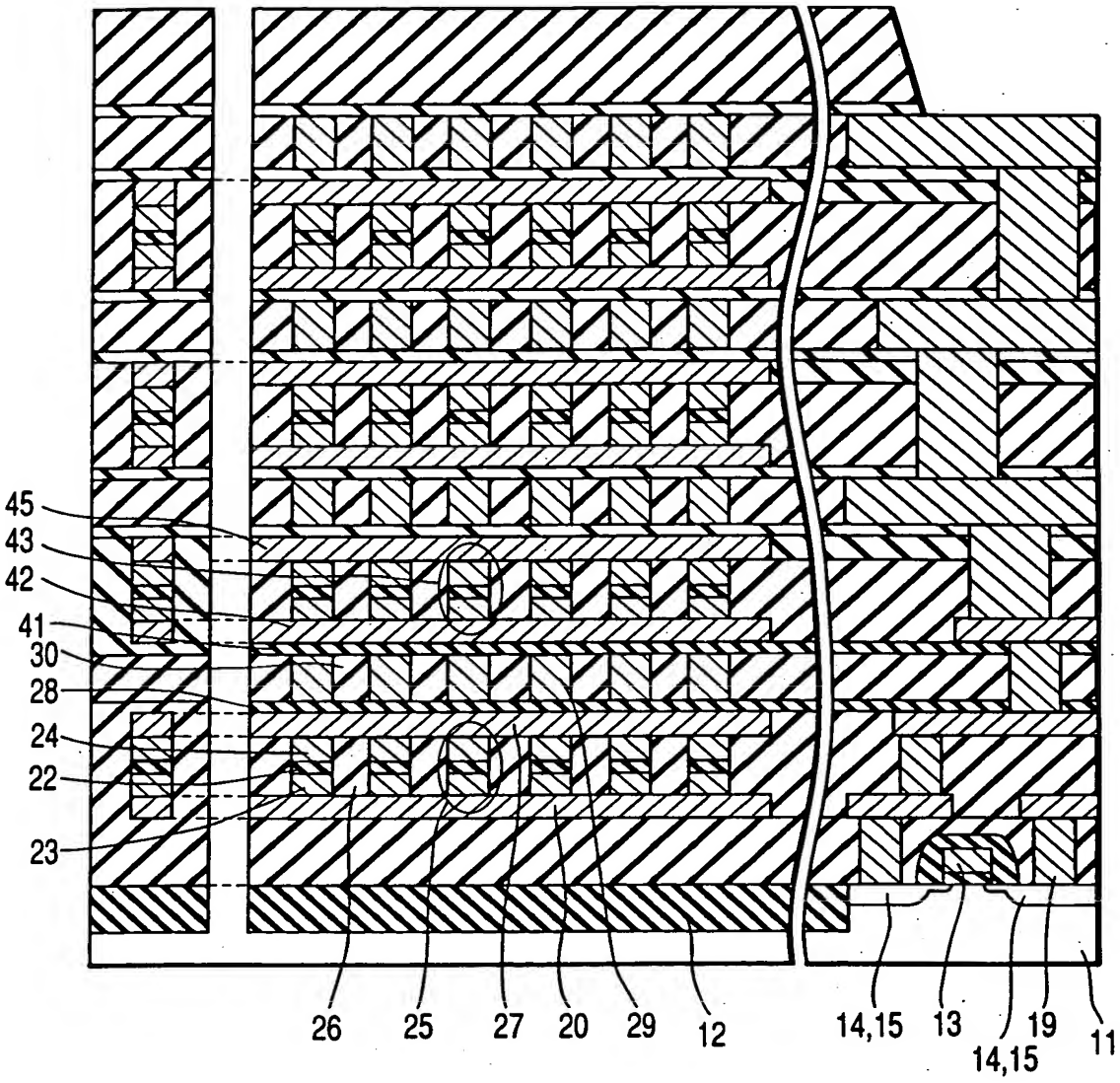

FIG. 30B

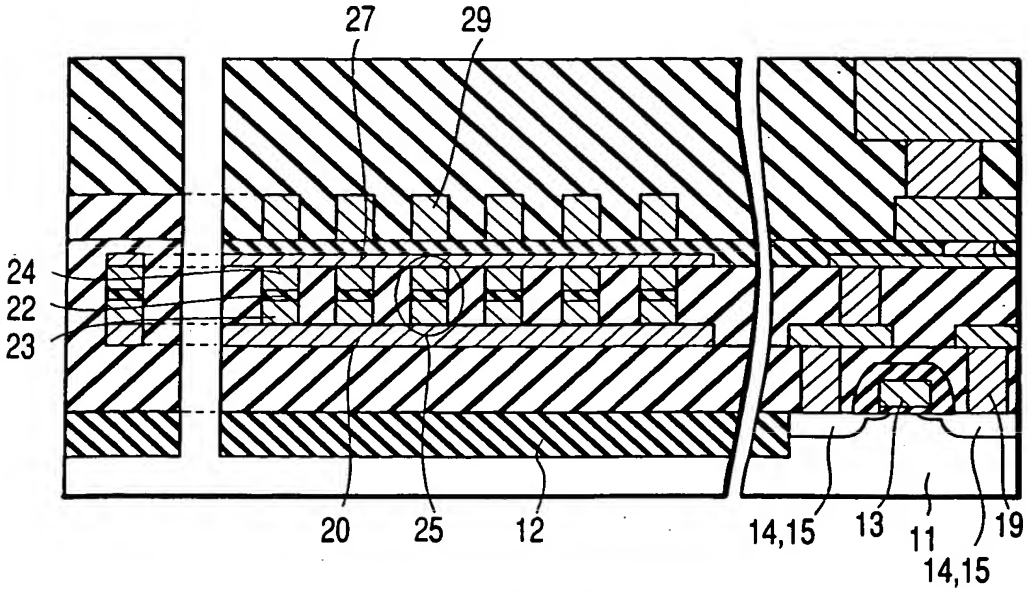
27
29
24
22
23
20
25
12
14,15
13
11
19
14,15

FIG. 32

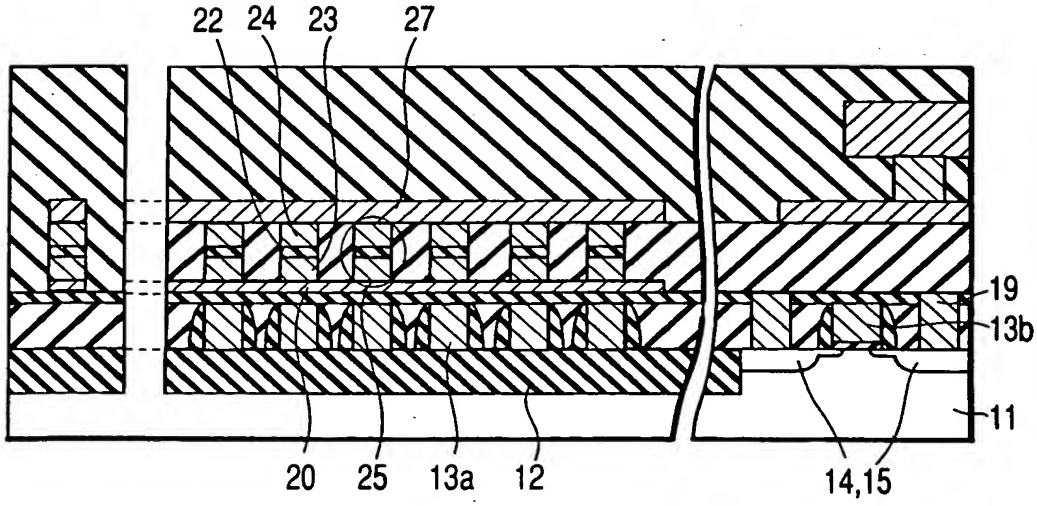
22
24
23
27
19
13b
11
20
25
13a
12
14,15

FIG. 33

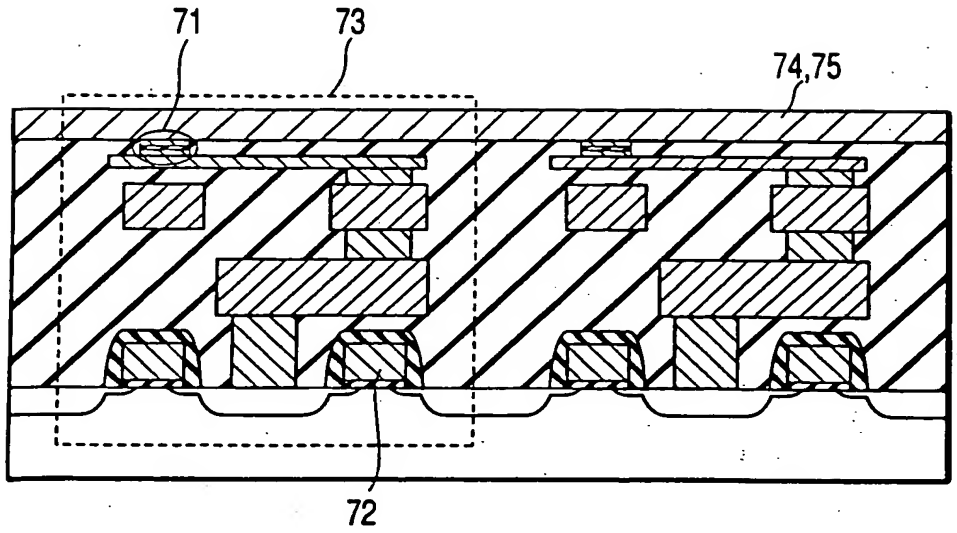
71
73
74,75
72

FIG. 34

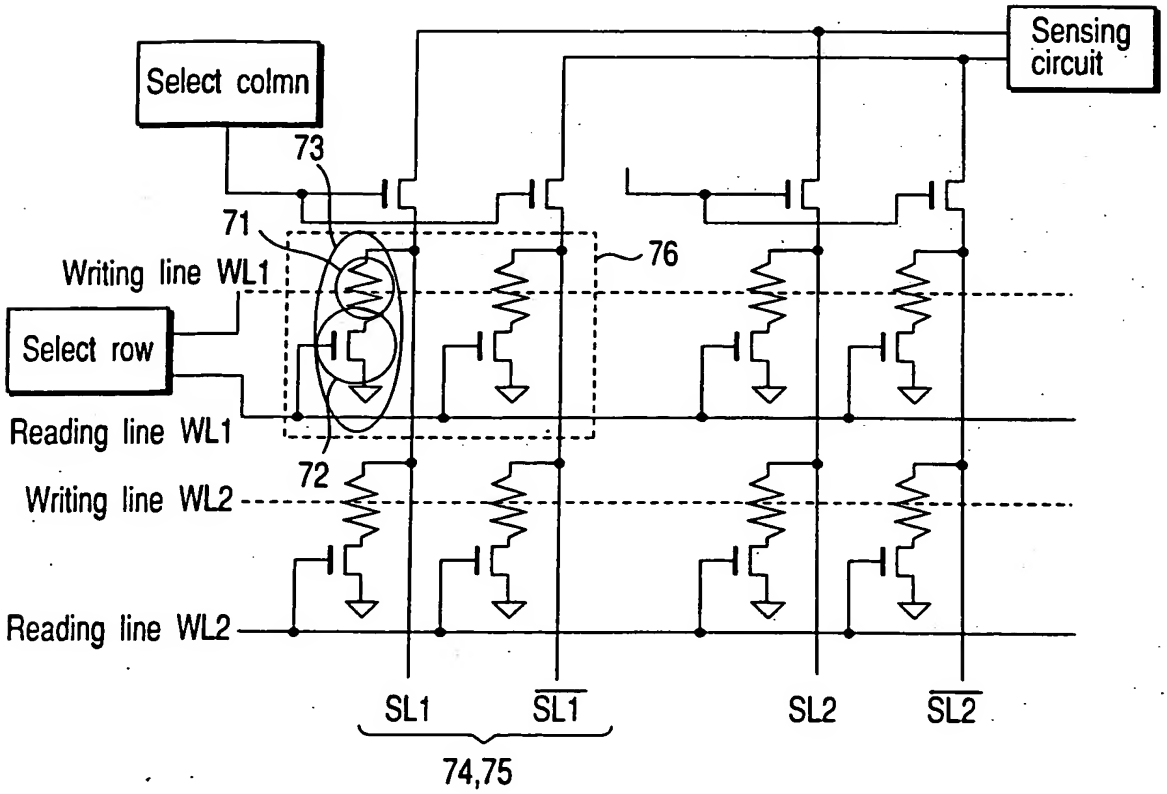
Select colmn
Sensing circuit
73
71
76
Writing line WL1
Select row
Reading line WL1
72
Writing line WL2
Reading line WL2
SL1
SL1
SL2
SL2
74,75

FIG. 35